

Varia

#1

An Inaugural Essay
On the Absorbents.

by
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of
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No function perhaps in the Animal Economy
is involved in greater obscurity, than that per-
formed by the absorbents. Owing to the generally
collapsed state of these vessels in the dead Body,
and the extreme secrecy with which they per-
form their office, they were for a long time entire-
ly unknown, and the phenomena which are now
ascribed to them were either unknown, or suppo-
sed to be the production of the venous system. The
true decomposition and renovation of the animal
body, was now generally if not universally believ-

ed, was a fact never dreamed of by the Ancients. Their ideas of Absorption were confined entirely to the different Stomachs both within and without the body, and which constitute no part of the living system.

By the labors however of more modern Anatomists a distinct species of vessels has been discovered, and operations of a more important nature than formerly conjectured are found to be carried on the animal body.

Eustachius a Roman Anatomist is considered by some as entitled to the honor of having, the accidentally, led the way in those researches, which have terminated in the present improved state of the branch of Anatomy as well as Physiology. In the year 1563 when engaged in the dissection of a horse he observed what is now known to be the primary trunk of the absorbent system. Not being able however to form any idea of its use, his discovery was immediately followed by very important consequences.

No farther progress was made in this investigation

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until the year 1622, when Asellius another
Italian Anatomist by chance discovered the lac-
teals in a living dog, while occupied in observing
the motion of its diaphragm. He not only pro-
ved their existence, but, what was equally impor-
ant, suggested their purpose. This discovery he
extended and confirmed by examining animals
of various species, and by analogy which is now
known to be just, he inferred their existence in
man.

This may be considered as a truly important
epoch in history of anatomy. A species of ves-
sel hitherto unknown, but of the highest im-
portance in the animal economy, burst upon
the sight and give to physiology a new form.
The attention which novelty ever attracts was
not wanting to the present discovery. Numerous
were those who enlisted themselves on both sides
of the question, some labouring with the warm-
est zeal in its support, others endeavouring to

present an innovation likely to undermine systems of the longest standing and most inviolated belief. From this period I shall not attempt to pursue the history of these vessels with any degree of minuteness, but endeavour only to give the result of those discoveries, which have at different times been made by various anatomists.

The conjecture of Asellius respecting the existence of the lacteals in the human body has been fully established by subsequent dissections, and in addition to these, other vessels have been discovered, differing only in their situation and the fluids which they generally convey, and distinguished by the name of lymphatics. The lymphatics tho' at first supposed to be specifically different, are now considered as only another branch of the same system with the lacteals, and as constituting with them an entire and distinct species of vessels under the name of absorbents.

After the existence of a new set of vessels was established

established, it then became a subject of contest whether they really performed the office from which they derived their name, and whether they were exclusively employed, or derived assistance in their operations from the venous system. It would be useless to dwell upon the proofs of opinions that are now universally admitted. That the lacteals absorb has been demonstrated by repeated experiments, and the absorption of the lymphatics, tho' perhaps not susceptible of decision by experiments equally unexceptionable as those by which the absorption of the lacteals was determined, is nevertheless founded upon facts which render it equally certain, and exclude even the possibility of doubt. Perhaps the most unequivocal proof of lymphatic absorption, is that which is derived from those vessels continuing to receive and transmit their fluids after the other parts of the body have become inactive, and have ceased to exhibit the signs of life.

The question still remains whether these vessels are the only absorbents in the body, or whether the veins participate in that action. That the lymphatics, by which I comprehend the whole absorbent system, are the exclusive agents in absorption, would seem to be probable from several considerations, first, from the simplicity of nature, who never employs for the execution of any purpose more instruments than are absolutely necessary, secondly, from the apparent incapacity of the veins for this office, and thirdly, they do absorb, from their having in no instance been incontestably detected in that action.

The veins appear to be deficient in that contractile power which is necessary in absorbents, in order to propel their fluids into the general circulation. Goodenoe denies the possibility of venous absorption upon the principles of hydraulics, his words are these, "In a living animal where the veins are contracting and pressing the blood, if one end of a capillary tube terminate in a vein and the other in a cavity, and if there be no action in that tube, or

capillary, that which arises from its being a capillary
one; or from the motion of the blood in the vein; if
there be any motion in that tube after it is full,
it will always be from the vein into the cavity and
never from the cavity into the vein, let the tube
be of any size or shape whatever." Now the vein
being allowed to possess little if any thing more
than elasticity, would be precisely upon the same
footing with a capillary tube.

Those experiments which proved absorption by the
lacteals would appear to be equally decisive
against venous absorption, unless we allow par-
ticular parts out of the venous system to be en-
dowed with this power.

The only places in which it has been maintain-
ed with any degree of probability, that the veins
absorb, are the placenta, the lungs and corpora
cavernosa penis, where they are said to arise by
open mouths. Blumenbach and Charles Bell
say expressly that venous absorption does obtain in
the lungs & corpora cavernosa.

those instances Cruikshank allows that the veins
arise here by open mouths and that the blood enters
into them from the cells in which it has been depon-
ed, and mingles with the volume of blood in the cir-
culation. Opposed however to the doctrine of absorp-
tion by the veins in general, he was unwilling to
admit it in any instance, and tells us that he was
once in the habit of explaining this fact upon the
principle of a vis a tergo, and to view it in the light
of a circulation than absorption of the blood. In the
same manner that Harvey explained the pas-
sage of the blood from the arteries into the veins in
every part of the body, which he ascribed to the pu-
lsive force of the ^{heart} ~~arteries~~ driving the blood not only
thru the parenchymatous substance which he sup-
posed to form a medium of communication between
these vessels, but also into the incipient radicles of the
veins. But Mr Cruikshank afterwards relinquit-
ed this explanation as unsatisfactory, observing that
the cells of the supposed parenchymatous substance
of the placenta &c were not tense at the time of this

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apparent venous absorption, which they ought to be,
to render the explanation satisfactory. He does not
appear however to have changed his sentiment upon
the subject of absorption, as thus he acknowledged his
inability to ^{resist} his seeming objection to the theory which
he had espoused, but rather, with Hodge, who for
the reasons already mentioned, denied the possi-
bility of venous absorption, to have ranked it among
the number of those facts which are not yet per-
fectly comprehended, and which are to be elucidat-
ed by future discoveries. The opinion which consid-
ers the Lymphatic system as exclusively employ-
ed in the operation of absorption, derives considerable ad-
ditional weight from the authority of the Professor
of Anatomy in the University of Philadelphia.
We are next to consider the manner in which this op-
eration is performed. No subject perhaps has afforded
more ground for speculation than the present. Where
certainty is unattainable, the imagination considers
itself privileged to indulge in all the wildness of
conjecture.

By some of the earliest theorists upon this subject the
absorbents were considered nearly in the light of massi-
mate tubes, and the solutions which were proposed
of their phenomena, were purely physical. According
to one which is mentioned by Cunitzschantz, the
lymph vessels were supposed to rush into the absorbents,
in consequence of vacuums which were continually
forming in the thoracic duct by means of its contract-
ing upon its contents. In order to render this correct,
it would seem necessary that the absorbents be in a state
of continual distension, for if ever they become collap-
sed, there is upon the supposition we are now consider-
ing, no means by which they can again be dilated.
There will then be no vacuum to be occupied, and un-
less they have the power of filling themselves, they will
forever remain empty. But it is well known that the
absorbents have at ^{different times} different degrees of distension and
occasionally collapsed. There are other objections to the
opinion, such as the infinite number of lymphatic
glands, the pressure of the different viscera, &c. which
would afford frequent interruptions to the effect of

subject vacuum in the Moravian duct upon the mouths of the absorbents.
Leyden supposed absorption to begin in the extremi-
ties of the vessels simply upon the principle of capil-
lary attraction. To this opinion, as Benoit has ob-
served, there appear to be several objections. He is
inclined to think that there was something like a
power of selection in the offices of the absorbents, which
enabled them to receive or reject different matters,
according to the manner in which they were affected
by them. This idea of a discriminative power was
founded upon the fact of the absorbents being in some
instances immersed for a considerable time in a
fluid without taking up any portion of it. An exam-
ple of this he mentions to have witnessed in the vi-
sces of the lacteals on the intestines, where some of
the vells were filled with chyle, and others again in
their immediate neighbourhood were perfectly emp-
ty. Now this as he observes could not have been the
case, if their taking up the fluid had depended
solely upon the principle of capillary attraction, as
this principle must operate uniformly and without

intermission, and under the same circumstances must always exhibit the same phenomena. Mr. Cuvier does not however seem to have entirely rejected the agency of capillary attraction in the commencement of absorption or in the entrance of the fluids into the mouths of the absorbents. His words are these; "The liquid to be absorbed affects the mouth of the absorbent, and determines it to give it admission or not. If it gives it admission, the first part of the lymphatic absorbs it, perhaps as has been supposed, by its action as a capillary tube." Richardson expresses in different words nearly the same opinion with that which has just been mentioned. He as well as Cuvier ascribes to the orifices of the absorbents a peculiar sensibility and a power of rejecting or receiving the fluid applied to them. The modifications of which this function is susceptible from a variety of circumstances, as age, sex, temperament &c. he considers as affording an unreasonable objection to the opinion of its depending solely upon physical

principles the operations of which are always to be distinguished from those of the living system, by their uniformity and want of intermission. I am not sure whether Richardson allows capillary attraction to be at all concerned in the phenomenon of absorption, but I am myself disposed to adopt the opinion which supposes this function to result from the operation both of a vital and physical principle. It seems not improbable that the act of taking up their contents is similar to that of capillary tubes, but that their being in a state of preparation to perform this action depends upon the exertion of a living power. "Each lymphatic absorbent," says Richardson "when disposed for absorption, erects, draws with it the surrounding membranous parts and thus forms a small tubercle, analogous to the puncta lachrymalia." When in this state I suppose the lymph to enter them exactly in the same manner as so many capillary tubes, but in assuming this state they exert a living power. With respect to the peculiar sensibility or power of

selection which is ascribed to these vessels, there appears to be no evidence so indisputable as to force conviction, or to render it impossible to entertain a doubt upon the subject. It would appear not very easy to explain why the same liquid should be taken up by some of the absorbents and rejected by others upon the principle of a power of selection. If they really had such a power would it not in all probability be exerted in favor of but comparatively a small number of substances and those of an innocent nature? The principal object of such a discrimination between the articles received would certainly be to guard against the introduction of noxious substances into the system. But that this object is not attained is sufficiently evident from the dreadful effects which too frequently present themselves, occasioned by the absorption of substances destructive not only to the vessels which take them up, but to the whole body. There is not much reason to suppose that the vessels which take up the various, the venereal and other poisonous matters would

not receive any substance whatever when reduced to a state of sufficient tenuity to enter their orifices. There appears to be little reason to consider the lymphatics as exempt from the laws which regulate muscular action in general. It is natural to suppose that they like every other part of the living system, require intervals of rest, and that every undue or long continued exertion of their power is followed by a state of torpor or indisposition to its renewal. Will not this view of the subject enable us to account for the fact mentioned by Cruikshank, without the necessity of ~~assuming~~ ^{supposing} ~~that~~ a peculiar ~~facility~~ ^{facility} or power of selection in the absorbents, which seems to be opposed by many considerations. Well may it be asked, "why should the absorbents possess such a power, with so little discretion in the exercise of it?" I should feel it incumbent on myself to offer some apology for expunging

an opinion in opposition to such high authority as that which has been mentioned, did I not know that in doing so, I have the sanction of authority at least equal, and in my own opinion far superior.

In the very cursory remarks which I have made upon the absorbents, I am aware that I have noticed but a part of the operations which are ascribed to them. They are said to be perpetually taking down the different parts of the body as fast as they are formed by the arteries, and that thus by the action of the two systems, the body is as it were always in a state of fluctuation or in other ~~other~~ words is constantly undergoing the operation of repair.

That some of the solid parts of the body at particular periods of life and in certain cases of disease are removed, there can be no doubt. But it is still a subject of question whether they are not decomposed previous to their absorption. "The solids" says Dr. are raised by the agency of the vessels on the chemical affinities of the circulating fluids. They must

be resolved by their decomposition, reducing them again
to the state of fluids, or the vessels throw out fluids which
dissolve them; an operation anterior to their absorption."
And says Richardson "It should not be forgotten that
organized living matter internally agitated by a double
motion, compounds and decomposes itself continually."
Altho perhaps we are not able to explain how this
decomposition is effected, yet the apparent impos-
sibility that solid substances as muscles, tendons
&c. should be removed by such instruments as the
absorbent vessels, without first undergoing a change
in their texture, would seem to afford sufficient rea-
son for believing that such a change does take place.
Putting the que mode out of the question, is it
perfectly certain, that every part of the body
does undergo the perpetual revolution which
has been already mentioned? That there is
no part of the body which may not occasionally
experience a change in the particles of which it
is composed, in consequence of accident or disease
I can readily conceive, but I must confess that

I am not able to discover any reason why an animal
shall any more than a wooden one which is per-
petually undergoing a change in the materials
of which it is composed, should experience the ravages
of time, or why an animal which may be con-
sidered as regenerated every eight or ten years should
ever die of longevity.